Food and Agriculture Organization of the United Nations

BRIEFING NOTE – MAY 2022

Assessments at systems level to identify and appraise climate risk and transformative action

1	**Information and assessments used by national stakeholders to identify and appraise transformative climate actions to advance NDC/NAP priorities in land-use and agriculture**	2	**Climate risk-informed land-use and agriculture sector priorities integrated into national and sectoral planning, budgeting and monitoring**	3	**Private sector engagement in climate action in land-use and agriculture increased**
Output 1.1 (Country): Evidence base for implementation of transformative climate action in land use or agriculture strengthened		**Output 2.1 (Country):** NDC and NAP priorities for land use and agriculture enhanced and integrated into sectoral planning and budgeting		**Output 3.1 (Country):** Enabling environment and incentives enhanced for private sector engagement in NDCs and NAPs implementation	
Output 1.2 (Global): Tools for assessing implementation options for transformative climate action disseminated		**Output 2.2 (Global):** Advocacy conducted to integrate transformative actions in NDCs and NAPs		**Output 3.2 (Global):** Knowledge expanded on opportunities and options for private sector engagement in transformative climate action	
				Output 3.3 (Global): Technical assistance facility to enhance private sector engagement through public-private sector collaboration in NDCs and NAPs implementation on land use and agriculture established	

CONTEXT

Complex and uncertain social, environmental and economic challenges – such as those pertaining to climate change impacts on agriculture and land use sectors and their dependent livelihoods – call for new types of thinking, solutions, and innovation that take into account the intricate and interlinked relationships between all components within the system. This is because achieving climate-related goals in these sectors will require nothing less than a **transformation of food and agricultural systems.**[1]

Transformative change is defined as "a system-wide change that requires more than technological change through consideration of social and economic factors that, with technology, can bring about rapid change at scale".[2] This will require shifts toward **systems-level thinking** to identify climate actions with **transformative** potential; **cross-sectoral** and **inclusive** approaches to planning that consider the most vulnerable natural resource-dependent communities; as well as engagement with the **private sector**.

Systems thinking looks at 'how different elements interact to form a whole or to influence other elements and systems'[3], whilst **systems approaches** are the set of processes, methods, and practices that aim for systems change.[4] Systems approaches consider systems in their entirety and work across disciplinary, organizational, and geographical boundaries to address the limitations of traditional, fragmented strategies for development.[5] These approaches can be strengthened and delivered through **systems leadership,** which refers to a set of skills and capacities that any individual or organization can use to catalyze, enable and support the process of systems-level change.'[6]

Systems approaches are increasingly recognized as being relevant for complex, inter-related challenges that need synergistic responses, such as the fulfillment of the **2030 Agenda for Sustainable Development** and the implementation of the **Paris Agreement**. Changing entire systems is challenging and time-consuming, especially in the public sector, however, new practices for systems-wide change can be rolled out even when larger, static core processes remain functioning.[7] This could mean focusing on just one component whilst considering its linkages to the broader system – for example, focusing on a particular **value chain**; focusing on the **carbon or nutrient cycle**; focusing on an area, such as a **landscape,** and assessing it from a systems perspective or Landscape Approach; or targeting specific **innovations** in financial tools and technology. These are all examples of **transformative climate action** that SCALA aims to explore as components of broader, systems level change.

PURPOSE OF THIS BRIEF

In order to address the climate challenges faced by the land use and agriculture sectors through systems approaches, it is necessary to first understand how systems work. This means understanding the different components, actors, dynamics, and their interdependencies, as well as the risks, opportunities, and solutions that have an impact on outcomes.[8] This can be done by carrying out **systems-level assessments.** Systems-level assessments aim to define, identify and appraise climate risks and solutions from a social, ecological, economic, and political lens across diverse administrative boundaries and geographical limits, in order toprioritizee entry points for interventions that contribute to multiple goals (e.g., food security, climate resilience, inclusive livelihoods, income generation, environmental restoration, carbon sequestration).

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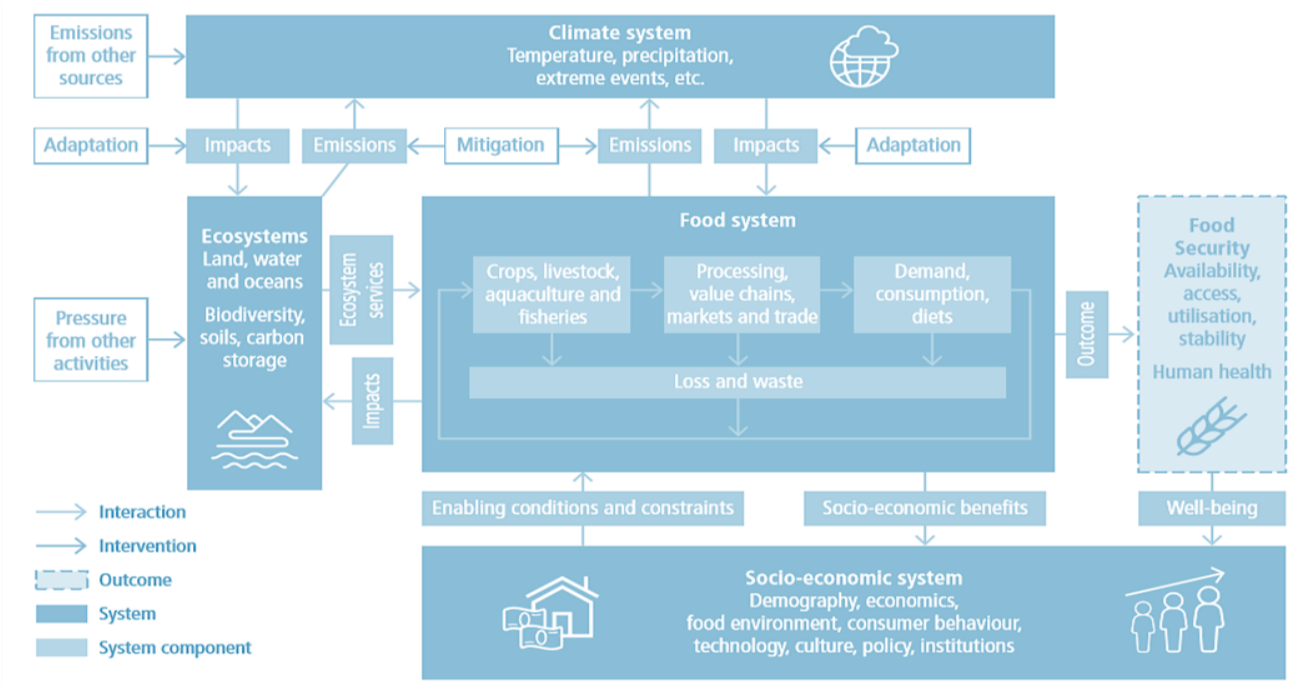
[1] FAO. 2016. The State of Food and Agriculture (SOFA) 2016: Climate change, agriculture and food security. (also available at http://www.fao.org/3/a-i6030e.pdf).
[2] IPCC. 2018. Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the . (also available at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_AnnexI_Glossary.pdf).
[3] Alberta CoLab. 2020. Systemic Design - Alberta CoLab Info Sheet [online]. [Cited 15 May 2020]. https://open.alberta.ca/dataset/1e8c6746-e09e-4e58-b9a9-00d28a3a87f8/resource/0ab6674c-b699-42a3-aa91-f45aeb1ed41f/download/energy-colab-systemic-design-info-sheet.pdf
[4] OECD. 2017b. *Systems Approaches to Public Sector Challenges*. 152 pp. (also available at https://www.oecd-ilibrary.org/content/publication/9789264279865-en).
[5] FAO. 2018. Sustainable Food Systems. Concept and Framework. (also available at http://www.fao.org/3/ca2079en/CA2079EN.pdf)
[6] Dreier, Nabarro and Nelson. 2019. Systems Leadership for Sustainable Development: Strategies for Achieving Systemic Change. (also available at (https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/files/Systems%20Leadership.pdf)
[7] OECD. 2017. Systems Approaches to Public Sector Challenges. 152 pp. (also available at https://www.oecd-ilibrary.org/content/publication/9789264279865-en).
[8] Nelson and Jenkins. 2016. Tackling Global Challenges: Lessons in System Leadership from the World Economic Forum's New Vision for Agriculture Initiative. (also available at https://thevalueweb.org/wp-content/uploads/2017/01/NVAReport.pdf)

This brief provides an overview of systems-level assessments and what they might entail under SCALA. It discusses the methodologies, tools, and resources that can be applied in undertaking these assessments through Activity 1.1.2 of the programme, which in turn can inform the design and implementation of activities under Outcomes 2.1 and 3.1 (see text below). It also highlights key considerations that systems-level assessments seek to explore and provides guidance on cross-cutting areas that can be integrated such as private sector engagement and gender and social inclusion.

SCALA'S APPROACH TO SYSTEMS-LEVEL ASSESSMENTS

As depicted in Figure 1, the interlinkages between the climate system, food system, ecosystems (land, water, and oceans including biodiversity,) and socio-economic system are complex.[9] **Systems-level assessments** consider precisely, for example, how the food system will be affected by climate change and where it is most vulnerable. This allows for **maximizing synergies, negotiating trade-offs,** and **identifying co-benefits** that deliver on multiple climate and development goals, across systems.

FIGURE 1 Interlinkages between the climate system, food system, ecosystems, and socio-economic system



Source: Mbow *et al*. (2019)

Given the complexity of food systems however, such an analysis must take place at a workable scale. This can be realized by adapting systems-level assessments to a particular sub-system. Under SCALA, for example, countries could undertake a (i) landscape assessment with a focus on land cover and land use change, land degradation or biodiversity loss (ii) a value chain analysis or (iii) assessments which contribute to enhancing the knowledge base on a particular component of a system, for which existing information on the other components may already be available.

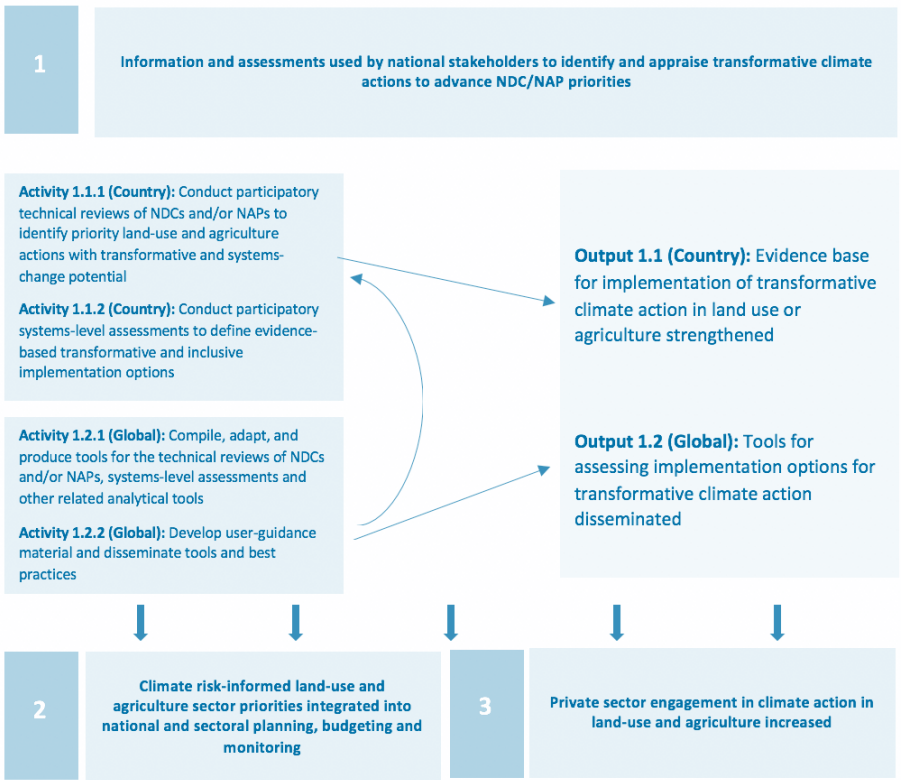
[9] Mbow, C., Rosenzweig, C., Barioni, L.G., Benton, T.G., Herrero, M., Krishnapillai, M., Liwenga, E., Pradhan, P., Rivera-Ferre, M.G., Sapkota, T., Tubiello, F.N. & Xu, Y. 2019. Food Security. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

The aim of Output 1.1 under SCALA is to strengthen the evidence base for transformative climate action in land use and agriculture. As part of Activity 1.1.1, SCALA supported countries to screen agriculture and land use priorities outlined in NDCs and/or NAPs for transformative potential and develop country-specific theories of transformative change through multi-stakeholder consultations. The results of these and other inception phase activities were then used to develop national work plans, which include steps to design and deliver systems-level assessments under Activity 1.1.2, aiming to improve the understanding of climate solutions identified through Activity 1.1.1.

The assessments conducted under Activity 1.1.2 will be informed by frameworks, tools and guidance material developed under global-level Activities 1.2.1 and 1.2.2 (Figure 2). This includes tools and approaches produced through the NAP-Ag Programme on cost-benefit analysis, impact evaluation, multi-criteria analysis and gender-responsive value chain analysis, as well as tools and methodologies from other organizations. These tools will be tailored and adapted to country contexts. Additional relevant tools and methodologies, for example for GHG emissions assessments, land use change analysis, economic appraisal and so on will be compiled and shared with the country offices. These may be accompanied by capacity development for national experts to ensure that the knowledge and skills required to undertake such analyses and/or future replications are enhanced.

Crucially, SCALA aims to adopt a whole-of-government approach. Thus, the data collection, consolidation and validation processes for these assessments should ideally be (1) conducted with national-level technical expertise (various sectoral ministries, academia, research institutes, national meteorological offices and ministries in charge of statistics) and (2) carried out in a participatory and inclusive manner in consultation of other relevant groups specific to the areas of interest and which are usually under-represented, such as farmers' organizations, women's groups and youth. Private sector actors should also be involved from the beginning to ensure that the information generated is relevant to their priorities and decision-making. Ensuring systems-level assessments are conducted through inclusive multi-stakeholder processes brings to surface the inherent gaps and tradeoffs in planning for transformative climate action. It also allows for stronger consensus-building, institutional buy-in and country ownership at every stage, including climate planning, budgeting and monitoring that SCALA aims to facilitate under Outcome 2 as well as the development of bankable projects in collaboration with the private sector under Outcome 3 (see Figure 2).

FIGURE 2 Linkages between SCALA outcomes, outputs, and activities



PLANNING FOR SYSTEMS-LEVEL ASSESSMENTS UNDER SCALA

Systems-level assessments ultimately aim to support informed decision-making by enhancing the understanding of a system in its entirety and assessing how each of its components interact with one another and with the broader system as a whole. In order to do so, they must be based on the available science, up-to-date methodologies and local knowledge that takes into account specific contexts and needs. Given their holistic nature, key questions to consider when planning for systems-level assessments in the agriculture and land use sectors, may include:

- What is the **state of natural resources and agriculture** in the assessment area?
- What are the **observed and/or expected climate-related impact**s on natural resources and agriculture systems in the assessment area?
- What are the **differentiated risks** associated with exposure to adverse climate change impacts on agriculture systems for different rural households and socio-economic groups?
- What are the **current adaptive practices and coping strategies** to adverse climate impacts on agriculture systems and how effective are they?
- What are the **GHG emissions/removals** associated with current agriculture and land use practices and value chains in the assessment area?
- Which **adaptation and mitigation options** exist and where? What are the differential costs and benefits of such options? Who would benefit from implementation and who might be left worse off?
- Which **technology** is associated with the implementation of the climate action and what barriers and opportunities are there to its dissemination?
- Do the right **policy, financial and social incentives** exist to facilitate the uptake of prioritized intervention options?
- What are the **gaps, needs and challenges** that need to be addressed for system-level change?
- Which **stakeholder** groups should be engaged for inclusive and effective implementation?

As countries prepare to conceptualize and design systems-level assessments under SCALA, the following activities may be undertaken adapted to the scope of assessment being planned and in alignment with the overall workplan:

- Organise discussions with those involved in consultative processes under Activity 1.1.1 (if not done already) for insights on which systems-level assessment(s) is/are most appropriate given their areas of interest (e.g., farmers' organisations, women's groups, and private sector actors).
- With support from global team and backstoppers, develop concept note outlining the background, core objectives, assessment questions, key stakeholders and potential methodological approach (see Annex 1).
- Conduct a review of the existing information available at the country level through desk research and in consultation with government stakeholders, research institutions and relevant initiatives. This could include conducting a stocktaking of existing data and studies that have used historical and/or future climate data to assess the potential impact or suitability of the adaptation and mitigation options.
- Draft terms of reference to define the scope of assessment(s), including whether it would be a value chain or landscape assessment, holistic or targeting a component of the selected system; tools or methodological approach to be used; timeline, skills, and expertise required.
- Provide support to consultants/assessment team as needed, including by organising interviews or consultations with key informants relevant to the assessment.
- Provide feedback on assessment(s) on the completion of agreed upon milestones and organise a validation workshop with key stakeholders.
- Disseminate key results from assessment(s), organise discussion around the most suitable modes of implementation as well as the required capacity building needs to establish the enabling environment for successful implementation of options.

POTENTIAL PARTNERSHIPS TO EXPLORE FOR SYSTEMS-LEVEL ASSESSMENTS

Partners engaged at the country level will depend on country needs and priorities on the basis of which workplans have been elaborated and an assessment of key stakeholder groups relevant to the programme, including those that have been engaged throughout the inception phase. An indicative list of partners that could be engaged for systems assessment-related activities could include;

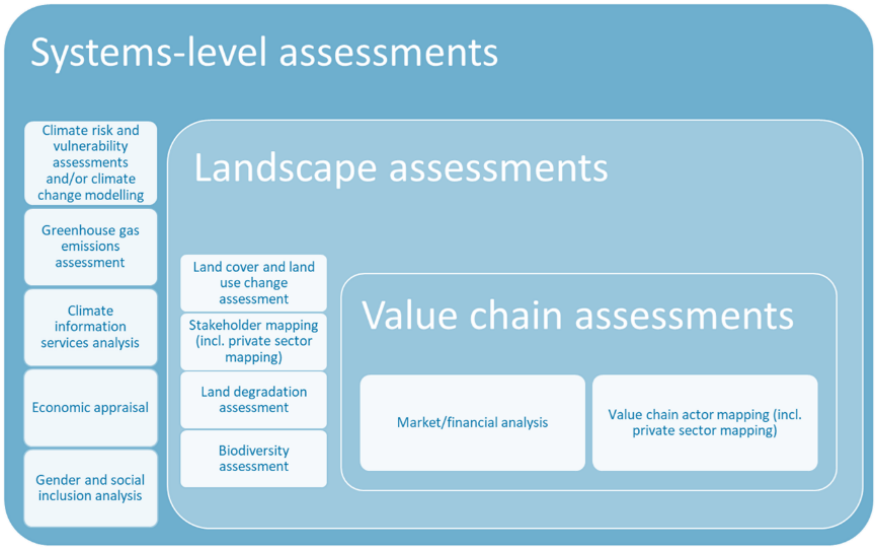
- Ministries responsible for climate change, land use and agriculture, environment and natural resources, forestry, fisheries, water, women, planning and finance;
- National meteorological offices and departments of statistics;
- Local universities and research institutes;
- Civil society such as farmers' organisations, women's groups, indigenous communities and other vulnerable groups;
- The private sector[10];
- Community based organizations (CBOs) engaged in climate change and environmental management.

At the global level, partnerships will be developed with the NDC Partnership, the UNDP Climate Promise, other NDC and NAP related initiatives. Collaboration will also be enhanced with organizations or entities relevant to the specific landscape chosen by countries. This could include the Commission on Genetic Resources for Food and Agriculture at FAO, Friends of EbA (FEBA), Global Bioenergy Partnership (GBEP), Global Water Partnership (GWP), Green Commodities Programme (GCP) at UNDP and FAO's Hand-in-Hand Initiative.

OVERVIEW OF DIFFERENT SYSTEMS-LEVEL ASSESSMENTS

Figure 3 below depicts how the conceptualisation of various systems-level assessments, their associated sub-level assessments and methodologies, and how they all collectively tie in to help achieve the goals of the programme may be considered.

FIGURE 3 Conceptualization of systems-level assessments to reflect SCALA's approach



[10] Under SCALA, the term private sector encompasses a range of actors including Micro, Small and Medium Enterprises (MSMEs), Large Enterprises and Multinational Corporations (MNCs), Capital Providers (Investors) and Market Facilitators (including banks, venture capitalists and angel investors).

Landscape assessment

A **landscape** is an area defined by geographic boundaries (e.g. watershed), administrative boundaries (e.g. district) or both.[11] It encompasses a variety of land uses, natural/ecosystems, as well as socio-economic systems, and can thus be considered an overarching system. In recent years strategies that recognize the inextricable link between forests, water, biodiversity, carbon, agriculture, energy and other elements are increasingly being developed, as is the understanding of how they are shaped by social, economic, political and environmental conditions.

Prominent among these are **landscape approaches** which take a holistic view in exploring sustainable solutions that reconcile human need, development benefits and nature conservation goals.[12] They refer to a 'set of concepts, tools, methods and approaches deployed in landscapes in a bid to achieve multiple economic, social and environmental objectives (multifunctionality) through processes that recognize, reconcile and synergize the interests, attitudes and actions of multiple actors.'[13] Integrated landscape approaches for sustainable land use and agriculture can encompass and cut across various options such as watershed management, biodiversity conservation, sustainable land management, forest and landscape restoration, ecosystems-based approaches and coastal area management.

The design of each landscape assessment is (country) context-specific and should take into account the shared goals and objectives of relevant stakeholders. However, they can be tailored around the following steps outlined in Table 1, which countries can choose from depending on their needs and the scope of their assessment.

TABLE 1 Steps in designing a landscapes assessment. Adapted from A Guide to the Restoration Opportunities Assessment Methodology (ROAM)

PHASE	STEPS	KEY ISSUES TO CONSIDER
Phase 1: Planning and Preparation **For landscape assessments**	Defining the problem	What are the major challenges with regard to? How can they be addressed? How would this approach align with and contribute to national policies?
	Engaging key partners	Which institution(s) should lead the assessment? Which other institutions and experts should be involved? What skills are needed on the assessment team? What resources are available?
	Defining scope and outputs	What are the target outcomes of the assessment? What can the assessment deliver given time, resource and any other constraints?
	Stratifying the area	At what scale can the assessment feasibly be undertaken?
	Identifying options relevant to the approach	What kind of interventions with regard to… exist and are viable in the area?

[11] FAO. 2020. FAO Term Portal [online]. http://www.fao.org/faoterm/en/
[12] Sayer et al. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. [online]. https://www.cifor.org/knowledge/publication/4136/
[13] Minang et al. 2015. Climate-smart landscapes: Multifunctionality in practice. [online]. https://www.worldagroforestry.org/output/climate-smart-landscapes-multifunctionality-practice

		What other interventions might be possible?
	Determining assessment criteria	What ecological, social, economic, political factors are relevant? What spatial data is available on these issues? What other data can be used as proxy indicators?
	Planning the assessment	Given the criteria and indicators, what data is required? What data gaps exist? Which stakeholders should be engaged and how? What coordination mechanisms can be used? What are the objectives of the inception workshop?
Phase 2: Data Collection and Analysis	Sourcing data	What data is available and where is it? What is the quality and scale? Potential sources include experts and stakeholders, existing data sources or commissioning new data collection exercises. What tools are needed?
	Mapping opportunities	What quantity and types of data are available? Options for mapping include 'digital mapping' and 'knowledge mapping.'
	Economic analysis	What are the associated costs and benefits of potential interventions? How can they be evaluated? How do they compare with the costs and benefits of existing interventions?
Phase 3: Results to Recommendations	Validating results	How can the validity and relevance of the results be tested? Who should be invited to the validity workshop?
	Incorporating feedback	How best can feedback be incorporated to ensure all perspectives are represented?
	Identifying financing options	How can the interventions identified be financed through existing mechanisms and/or new sources of funding?
	Recommendations for implementation	What are the next steps and how can they be implemented?

Source: IUCN and WRI, 2014

Within the framework of landscape assessments, specific approaches could include: (a) a land cover and land use change assessment; (b) a land degradation assessment; or (c) a biodiversity assessment.

(a) Land cover and land use change assessments

The land surface comprises the relevant biophysical features of its living and non-living components, including natural and managed ecosystems such as cropland and forests, urban areas, etc. Land cover statistics codify the visible features of these components into simplified classes, such as grassland, shrubs, tree cover, etc. Land use statistics, in the other hand, seek to describe the use of those same components for human benefits, for instance activities for crop and livestock production, nature conservation, infrastructure development. Both land cover and land use statistics are central in understanding key local, regional and planetary trends, including agricultural and forest landscapes, to reveal changes such as conversion of land to or from agriculture, deforestation, cropland management, etc.

Countries can tap into the extensive FAOSTAT Land Use statistics and associated land indicators that provide information on the full land use by country, including agricultural land (1961–2018) and forest land (1990–2018). Information is derived from remote sensing products generated independently by specialized agencies, as well as a standard Land Use, Irrigation and Agricultural Practices questionnaire and the FAO Global Forest Resources Assessment (FRA, 2020).[14] FAOSTAT uses the FAO Land Cover Classification System (LCCS) developed to provide a consistent framework for the classification and mapping of land cover, and designed to map at a variety of scales, from small to large, enabling the comparison and correlation of land cover classes regardless of mapping scale, land cover type, data collection method or geographical location. FAO has also developed a stand-alone application for land monitoring called Collect Earth (see Annex II for more details).[15]

(b) Land degradation assessments

Land degradation has been defined as the set of processes that lower the current and potential capability of the land to perform ecosystem functioning and services that supports society and development. Degradation processes cause a decrease in the quality of land and can be classified as physical degradation (e.g. soil erosion by water), chemical degradation (e.g. salinization), biological degradation (e.g. decline in soil organic matter). The methods to assess land degradation depend on the type of land degradation: physical, chemical or biological, they range from simple qualitative observations in the field to elaborate computer simulation modelling of complex processes.

The FAO Land Degradation Assessment in Drylands (LADA) is a scientifically-based approach to assessing and mapping land degradation at different spatial scales and at various levels (from local to global). It was initiated in drylands, but the methods and tools have been developed so as to be widely applicable for the cost effective and scientifically robust assessment and monitoring of the status and trends of other ecosystems and land resources in diverse contexts with minimal required adaptation. Land degradation is defined as a biophysical, social, economic and environmental issue that must be dealt with through a combination of geo-informational, scientific and local knowledge tools. Linking of local and national assessments enables the identification of incentives, support mechanisms and actions that promote the adoption of sustainable land use and management practices.

Land degradation assessment is performed at: i) global level through the use of land use system (LUS) mapping and indicators (e.g. aridity index, net primary productivity index) that are used to idenfity trends, ii) national level through land cover change mapping and refining of LUS mapping, or iii) local level through assessment areas that allow acquiring local perceptions and behaviours and identify status, causes and effects of land degradation in a given terrain and training on biophysical measures and rural appraisal tools that consider socio-economic contexts as well as land use practices. All methodological information produced by LADA feeds into the assessment of land degradation processes and their effects on farms, catchments, landscapes and interactions that affect ecosystem functions and resilience. LADA provides a sound basis for

[14] FAO. 2021. *Land statistics. Global, regional and country trends, 1990–2018*. FAOSTAT Analytical Brief Series No. 15. Rome. [online] . https://www.fao.org/3/cb2860en/CB2860EN.pdf

[15] Collect Earth: Land Use and Land Cover Assessment through Augmented Visual Interpretation https://www.fao.org/e-agriculture/news/collect-earth-land-use-and-land-cover-assessment-through-augmented-visual-interpretation

the preparation of investment frameworks for land resources (soil, water, vegetation/ biodiversity, ecosystems) management and planning especially in response to climate change.[16, 17]

(c) Biodiversity assessments

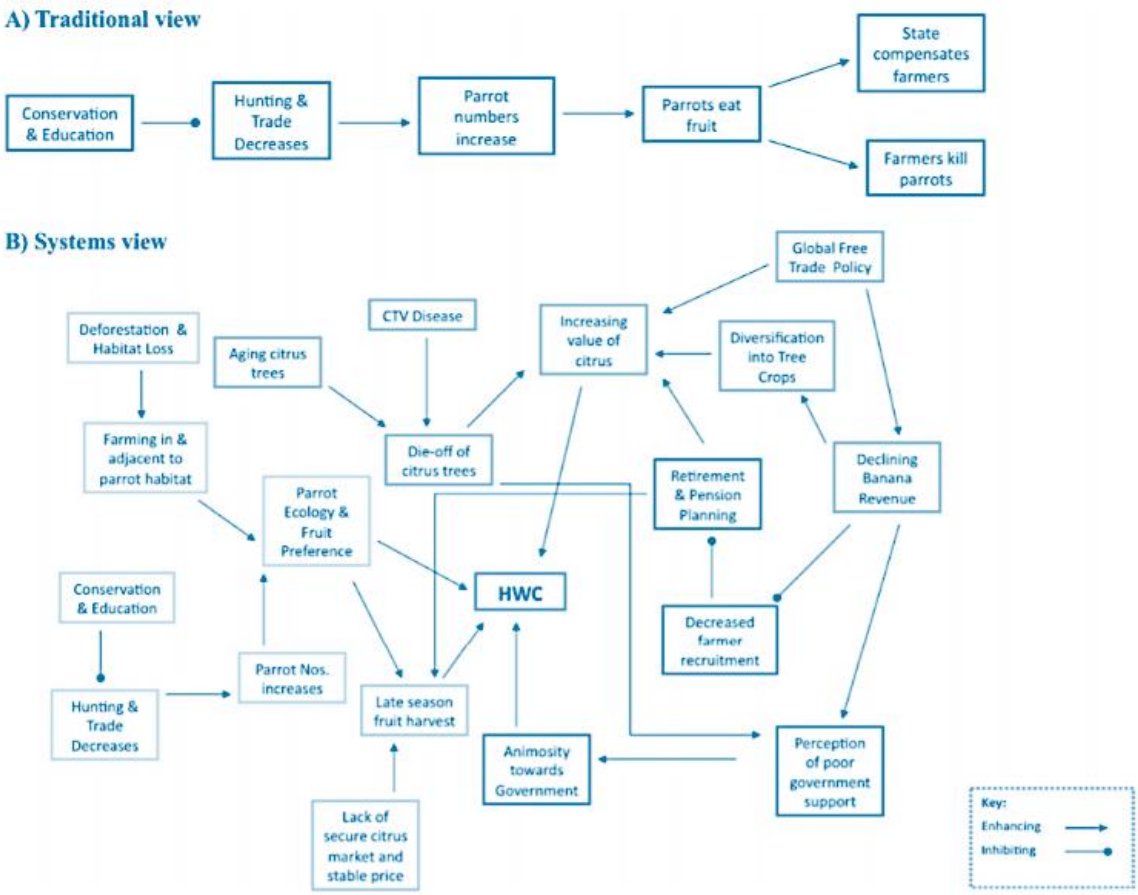
As defined by the Convention on Biological Diversity (CBD), **biological diversity** (biodiversity henceforth) is "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, diversity within species, between species, and of ecosystems" [Article 2]. **Biodiversity assessments** are necessary to ensure that the strategies, programmes and policies provided for in Article 6[18] are implemented and results achieved, and to ensure basic information is provided on biodiversity (status, stresses, risks, benefits) required for Article 14.[19]

Amongst many drivers including climate change, the expansion of land use for agricultural production is having an increased impact on the loss of biodiversity across regions, landscapes and within various ecosystems. Whilst there is a pressing need for more focused efforts into biodiversity conservation due to its intrinsic value, there are also three key reasons to pursue conservation to achieve future transformative agriculture development which is resilient and sustainable. **Agricultural biodiversity** – the diversity of crops and their wild relatives, trees, livestock and landscapes – is a source of; (i) important traits for breeding stress-tolerant crops and animal breeds; (ii) GHG emissions reductions for meeting climate change mitigation goals; and (iii) nutritious foods which are culturally acceptable and can be adapted to local and low-input agricultural systems with high economic efficiency gains.[20]

Biodiversity assessments traditionally focuses on characterising the various aspects of biodiversity (e.g. genetic variability, species richness, functional diversity). This approach, whilst useful in many contexts, reduces biodiversity to a collection of linear elements, instead of a collection of *non-linear processes* i.e. the dynamic interactions among the conforming elements (see Figure 4 for an illustration of this difference and the various drivers of human-wildlife conflicts (HWC)). Adopting a **systems-level approach to biodiversity** assessments reveals additional layers of complexity at all levels of biological aggregation. This affords policymakers and resource managers a deeper understanding of both the parts and the structure of the biodiversity system as well as the processes and linkages that determine system function: the ecological, evolutionary, functional, and cultural dimensions of biodiversity.[21] Most importantly, for SCALA, the approach to incorporate a biodiversity lens for a chosen landscape is crucial for revealing the climate change-related environmental impacts (for instance, the composition of soil biodiversity which supports nutrient cycling and food production). The findings from the application of this lens in a landscape assessment will ultimately ensure that, for a given NDC or NAP priority climate action, the implementation route has fully considered the synergies and tradeoffs with respect to biodiversity conservation. Whilst systems-level analysis of biodiversity in agri-food systems is a burgeoning field, there are a variety of tools available for carrying out biodiversity assessments (Annex II).

[16] FAO. 2008. Land Degradation Assessment in Drylands (LADA). https://www.fao.org/3/ai555e/ai555e00.htm
[17] FAO. 2011. Land Degradation Assessment in Drylands Methodology and Results. https://www.fao.org/documents/card/en/c/6811dec2-0997-5e26-8798-0fae0dd069e3/
[18] Artcle 6 states "Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement." (see here for full Article: https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf)
[19] Article 14 states "The Conference of the Parties serving as the meeting of the Parties to this Agreement shall periodically take stock of the implementation of this Agreement to assess the collective progress towards achieving the purpose of this Agreement and its long-term goals (referred to as the "global stocktake") (see full article here: https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf).
[20] Bioversity International. 2017. Mainstreaming agrobiodiversity in sustainable food systems: Scientific foundations for an agrobiodiversity index. Rome (Italy): Bioversity International, 180 p. ISBN: 978-92-9255-070-7. [online]. https://hdl.handle.net/10568/89049
[21] Sterling, E. J., Gómez, A., & Porzecanski, A. L. (2010). A systemic view of biodiversity and its conservation: Processes, interrelationships, and human culture. BioEssays, 32(12), 1090–1098. doi:10.1002/bies.201000049

FIGURE 4 A comparison of traditional (linear) and systems views of human and biodiversity interactions: hypotheses for the causes of conflict among endangered parrots and citrus farmers on Caribbean islands



Source: Sterling *et al*. (2010)

Value chain assessment

Agricultural **value chains** refer to the whole range of actors and activities required to bring an agricultural product from its inception at the farm-level to its final end-consumer.[22] With climate change threatening agricultural value chains at all stages of production, transformative climate solutions must encompass modification beyond the production system.

A value chain approach to systems-level assessments enables the user to understand the evolving food system dynamics and the climate risks associated with all stages of the value chain.[23] Such a systemic approach allows for risk management both on the demand- and supply-sides, and allows for the possibility to identify change agents and leverage points for transformative climate interventions. Consequently, promoting agriculture value chains identified through a systemic approach can lead to greater climate resilience and sustainability, and greater socio-economic benefits by way of increased productivity, improved employment opportunities, access to greater markets and higher export levels.[24]

[22] FAO. 2020. FAO Term Portal [online]. http://www.fao.org/faoterm/en/
[23] FAO and UNDP. 2020. Toolkit for value chain analysis and market development integrating climate resilience and gender responsiveness - Integrating agriculture in National Adaptation Plans (NAP-Ag) Programme. Bangkok. https://doi.org/10.4060/cb0699en
[24] Vermeulen, S. 2015. How to do Climate change risk assessments in value chain projects. Rome

A **value chain analysis** is the process of compartmentalizing the different parts of the chain to better understand its structure and specific functions, as well as its comparative advantage. This involves:

- identifying actors at each stage of the chain and detailing their functions, relationships and interactions;
- determining the chain governance/leadership;
- identifying activities with added value;
- flow of goods, information and finance throughout the chain; and
- cost structure and product differentiation.

In practice, there are three main methodological approaches for a team to conduct value chain analysis (Figure 5).

FIGURE 5 Three key approaches to value chain analysis

Studies	Participatory (workshops, FGDs, etc)	Dive-in (learn as you go)
• Classical approach with consultants spending several weeks conducting primary research, reviewing statistics and such others; • Information, such as climate and gender related risks and vulnerabilities gathered from the field, is used to design climate-sensitive and gender-responsive programmes.	• As a streamlined approach, it brings together key value chain representatives for workshops, focus groups, etc.; • The value chain actors provide information, such as climate- and gender-related risks and vulnerabilities, and analyse it, with the support team acting as facilitators; • Information gathered is used to design climate-sensitive and gender-responsive programmes.	• Is premised on the belief that to best analyse the value chain, it is important to have in-depth relationships with the value chain actors and learn from them incrementally; • Consequently, it dives into the value chain based only on an initial facilitation activity; and • Climate sensitive and gender responsive support initiatives begin as soon as the target groups are selected.

Source: FAO (2020)

The intended outcome of value chain analysis in the context of SCALA would be to assess a value chain or set of value chains deemed critical by SCALA stakeholders for the implementation of agriculture-related climate priorities expressed in the country's NDC and/or NAP. The value chain analysis will also allow for a deeper understanding of the underlying constraints in the market system, the systemic winners and losers of a particular intervention, and the enabling environment needs, which can be useful inputs in the design of implementation options intended to create scalable, profitable, and sustainable value chains.

For carrying out a value chain assessment under SCALA, the proposed tool is the recently developed FAO and UNDP Toolkit for Value Chain Analysis (FAO & UNDP, 2020). Figure 6 presents an overview of the steps involved in the application of this toolkit; (1) Selection of geographical regions/areas of intervention; (2) Mapping and selection of value chains in light of climate risks; (3) Value chain mapping and analysis; (4) Planning interventions; and (5) Monitoring and evaluation.

FIGURE 6 FAO and UNDP Value Chain Analysis Toolkit

Methodology	Overview of Module C: the toolkit
	Selection of geographical regions / areas for intervention (Section 2)
Desk study	• Developing climate change vulnerability mapping for the region • Dividing the region under consideration into agro-ecological zones
Desk study / workshop 1[3]	• Selection of geographical regions for intervention based on agro-ecological zones and climate change vulnerability map
	Mapping and selection of value chains in light of climate risks (Section 3)
Desk study / workshop 2	• Mapping climate change risks and vulnerabilities and market demand of potentially suitable value chains • Developing a short list of promising value chains • Determining the criteria and developing the matrix for value chain selection
Desk study	• Desk study • Selecting the value chain
	Value chain mapping and analysis (Section 4)
Desk study and field visit 1	• Value chain mapping
Desk study	• Value chain analysis
Workshop 3	• Validating constraints and opportunities
	Planning interventions (Section 5)
Desk study	• Developing climate change vulnerability and risk interventions
Field visit 2	• Assessment of potential interventions
Desk study	• Identifying the activities for the selected intervention
Workshop 4	• Validating interventions and activities • Prioritizing interventions and activities • Identifying facilitative agencies for implementation
	Monitoring and evaluation (Section 6)

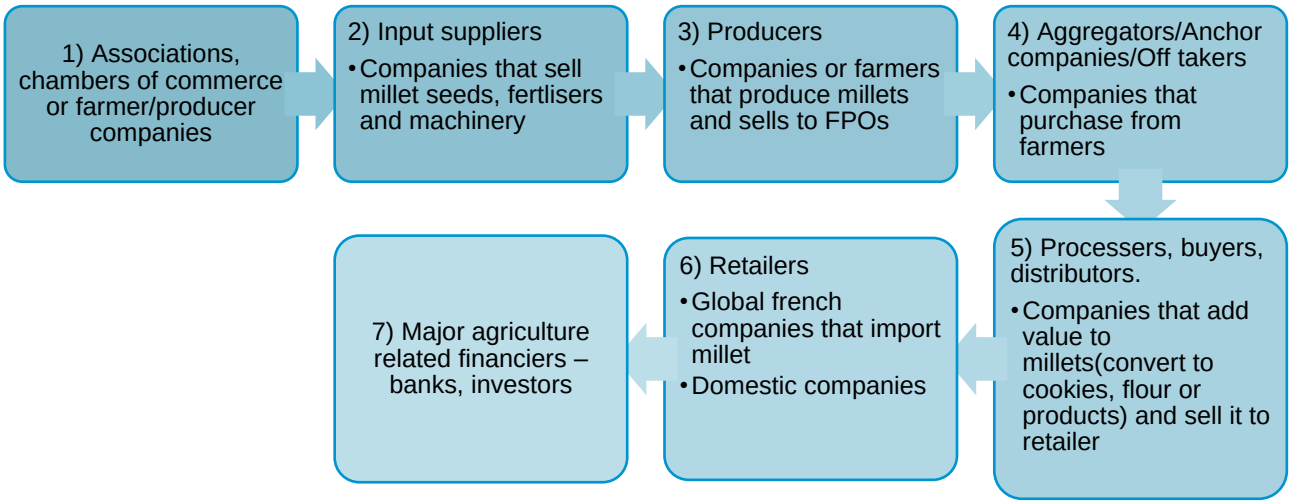
Source: FAO & UNDP (2020)

Private sector actors mapping within a value chain assessment

A systems-level value chain approach to strengthening climate resilience recognizes that climate change affects more than a business' direct operations, but also impacts local communities and natural environments. This implies all the stakeholders in the food system ranging from smallholder farmers to processors, investors, governments, traders, manufacturers, brands, retailers and consumers – need to commit to be actively involved and collaborate.

To support private sector engagement under SCALA, a guidance document is being developed to support countries teams to carry out private sector actor mappings which help countries to understand who the private sector actors are (using a systems lens), and to determine how to engage with them so they can contribute effectively towards delivering climate solutions. An illustrative example of a systems-level private sector mapping of actors in the millet value chain is shown in Figure 7.

FIGURE 7 Private sector actors mapping of the millet value chain



METHODOLOGICAL FRAMEWORKS AND CROSS-CUTTING ISSUES TO CONSIDER WHEN PLANNING FOR SYSTEMS-LEVEL ASSESSMENTS

1. Economic appraisals

Economic appraisal of adaptation is moving away from a unique emphasis on efficiency and cost-benefit analysis of adaptation options to include consideration of non-monetary and non-market measures (such as ecosystem function, human health, water quality etc.), risk distribution, social aspects such as equity and behavioral biases, the distinct roles of private and public actors, and consideration of ancillary benefits and costs. A narrow focus on quantifiable costs and benefits – by use of the common approaches such as Cost-Benefit Analysis (CBA), Cost-Effectiveness Analysis (CEA) can ignore these other (typically non-monetized) dimensions of adaptation, which may potentially lead to maladaptive / residual outcomes.

2. Gender and social inclusion analysis

Gender and social inclusion analysis sheds light on how social, economic and political structures as well as unequal power relations can give rise to discrimination, subordination and exclusion in society. This type of analysis identifies women's and men's different knowledge, experience, needs, challenges, roles and responsibilities and considers intersecting variables such as age, ethnicity, class, caste, disability status, sexuality, religion, and others. Issues that may come to light through gender analysis relate to: the power dynamics and decision-making processes at different levels (e.g. household, community, regional, national); legal rights and status; labour divisions and benefit-sharing within households and communities (e.g. in agricultural cooperatives); access to resources, information and services; as well as aspirations, needs, interests and constraints. In the context of climate action, gender and social inclusion analysis can be used to:

- identify disadvantaged members of a population and the nature of their disadvantage, helping to differentiate the ways distinct groups experience and respond to climate impacts and produce a more complete vulnerability analysis;
- identify the skills, knowledge, perspectives of women and men, which can then help (i) determine the climate action priorities of different groups and (ii) deploy existing skills and resources in the implementation of climate actions; and

- identify the causes of structural inequalities and power dynamics in order to develop strategies to minimize disadvantages, improve targeting of benefits (financial and other) and increase access to opportunities of climate action.

3. Climate information services analysis

Special attention must also be given to the importance of mapping and having a full understanding of the availability of climate information across the entire value chain, from production to delivery. This is because the use of climate information is critically important in decision-making related to agriculture sector planning and development, as the sector relies heavily on natural resources, and as its output is especially sensitive to climate change and variability.

4. Climate risks and vulnerability assessments

The climate challenges and associated risks faced by land use and agriculture sectors result from the interaction of climatic hazards, exposure and vulnerability of the integral systems – be it an (agricultural or natural) ecosystem or socio-economic systems like commodity value chains. Implying that adaptation to climate challenges requires an understanding of the level of vulnerability and exposure. This, therefore, makes climate risks and vulnerability assessment of a system as one of the critical steps in mitigation and adaptation planning and intervention/action. Applying a systems thinking approach, with climate risk and vulnerability as an entry point, enables the assessment of how individual system components (for example, water, biodiversity, land, soils etc.) or their interaction or interdependencies within the system (for example, water-soil health-biodiversity within the agricultural ecosystem) are exposed and impacted by climate variability and hazards. The system thinking pathway offers a comprehensive understanding of the risks, vulnerability and exposure of the system as a whole, rather than individual components. It, therefore, supports system-wide adaptation planning and interventions that are integrative and comprehensive.

Systems level assessments with integrated climate risk assessments for the agriculture sector may collectively refer to sub-activities including the collection of climate and agriculture data, translation of data to tailored products and provision of knowledge on past, present and future climate impacts on natural and human systems, and the application of this information for decision-making[25] at all levels.

Climate change modelling within a climate risks and vulnerability assessment

Climate risk and impact models are planning tools that generate understanding of the possible magnitude, timing and spatial distribution of future climate risks and impacts, while taking into consideration adaptation and development pathways. Often, these climate change risks and impact models are applied at individual sectors such as agriculture, forestry, land, water, energy etc. without considering the complex multi-sectoral interactions and interdependencies. Applying a systems thinking approach to modelling climate risks and impacts enables cross sectoral analyses and generates holistic (all [sectors]-inclusive) foundational evidence to support system wide mitigation/adaptation decisions and actions. An example is the CLIMSAVE,[26] a web based interactive simulation model that provides a holistic, cross-sector, climatic, and social economic change understanding through simulation of potential risks and impacts under climate and socio-economic scenarios, identification of sectoral and multi-sectoral vulnerability hotspots, identification of adaptation potential and evaluation of the cost-effectiveness of the considered adaptation measures.

5. Greenhouse gas emissions assessments

Agriculture accounts for almost one fourth of all the greenhouse gas emitted by humans. If food processing is added, this share rises to more than one third. Thus, monitoring and accounting for potential changes in greenhouse gas (GHG) emissions and the mitigation potential in agriculture is a vital component of any agricultural investment. The identification of climate mitigation impacts and interventions to reduce and remove emissions from the atmosphere safely and cost-effectively without reducing agricultural productivity can help countries progress towards their NDCs and NAMAs' targets.

[25] Brasseur, G. P., and L. Gallardo (2016). Climate services: Lessons learned and future prospects, Earth's Future, 4, 79–89, doi:10.1002/2015EF000338
[26] Harrison P A, Holman I P and Berry P M 2015. Assessing cross-sectoral climate change impacts, vulnerability and adaptation: an introduction to the CLIMSAVE. Climate Change 128, 153–67 ; https://networknature.eu/product/1915

In this context, countries can consider tapping into several potential methodologies for GHG accounting. The first to be considered is the EX-Ante Carbon Balance Tool (EX-ACT) that quantifies the amount of GHGs released or sequestered from agricultural production. It covers the Agriculture, Forestry and Other Land Use (AFOLU) sector, and can be used at any stage of the intervention, from the design, M&E of projects and policies to support informed decision-making processes. Likewise, the FAO Recarbonization of global agricultural soils (RECOSOIL) may be used, a mechanism for scaling up sustainable soil management (SLM) with a focus on agriculture soil organic carbon (COS). The NDC Expert Support Tool (NEXT) is also a useful tool, as it provides a 30-year time-series of annual and cumulated estimates of carbon removal and GHG emissions reductions from climate actions made by countries.

Please see Annex II for a full list of tools that can be used to undertake different components of systems-level assessments.

ANNEX I – CONCEPTUALIZATION OF AND PLANNING A SYSTEMS-LEVEL ASSESSMENT

This set of guiding questions can be used to facilitate a brainstorming session during conceptualization and pre-planning of the systems-level assessment under SCALA Activity 1.1.2.

ELEMENT	GUIDING QUESTIONS
Purpose	What is the **overall purpose** of the assessment?
Potential assessment questions	What are the **assessment questions** to be answered? For example: ○ What is the state of natural resources and agriculture in the assessment area? ○ What are the observed and/or expected climate-related impacts on natural resources and agriculture systems in the assessment area? ○ What are the differentiated risks associated with exposure to adverse climate change impacts on agriculture systems? ○ What are the current adaptive practices and coping strategies to adverse climate impacts on agriculture systems and how effective are they? ○ What are the GHG emissions/removals associated with current agriculture and land use practices in the assessment area? ○ Which adaptation and mitigation options exist and where? What are the differential costs and benefits of such options? Who would benefit from implementation and who might be left worse off? ○ Which technology is associated with the implementation of the climate action and what barriers and opportunities are there to its dissemination? ○ What policy, financial and social incentives exist to facilitate uptake of the prioritized interventions options and lead to transformative change? ○ What are the gaps, needs and challenges that should addressed for system-level change?

Climate action with transformative potential	If the SCALA Climate Action Review (CAR) Matrix tool was used in Activity 1.1.2, which NDC and/or NAP climate actions were evaluated for transformative potential? Which dimensions of transformation will be further evaluated in the system-level assessment: climate rationale; systems-thinking; private sector engagement; gender equality and social inclusion; sustainable development; a whole-of-government approach; technological and financial innovation?
Gender and social inclusion	What are the relevant gender and social inclusion issues in the system to be examined as part of the assessment? These could be related (but not exclusive) to the following: • Gender roles and inequalities in agriculture production and processing, including: access to and use of resources like land and information; time use; participation in markets and decision-making fora; and benefits like income and well-being. • Gender-differentiated impacts of climate change. • Suitability of existing policy, institutional and legal frameworks to support gender-responsive planning and climate action. • Underlying drivers of inequality, marginalization and empowerment including social norms, power dynamics. • Demographic changes including migration. • Traditional and indigenous peoples' knowledge in the context of climate change.
Scope and scale	**Scope – comprehensiveness:** Which key system dimensions, components or aspects will be considered in the assessment – e.g., environmental, social, economic and/or institutional? **Scale – coverage:** At which geographic, administrative, or agro-ecological scale will the assessment take place?
Methodology and tools	Which methodological approach and/or tools will be utilized to conduct the assessment? For example: ☐ Climate risk and vulnerability assessment ☐ Climate change impact modelling ☐ GHG analysis ☐ Market development and Value chain analysis ☐ Private sector investment risk and opportunity analysis ☐ Gender analysis ☐ Other (detail) Once the methodological approach and tools are specified, then data requirements and sources can be identified.
Deliverables	What are the expected outputs from the assessment?
Stakeholders	**Assessment team:** Who will carry out the assessment itself? The assessment team may be made up of various individuals with different skill sets, including government, university, academia and civil society. **Primary and secondary stakeholders to be consulted:** In the assessment area, which key stakeholder groups should be consulted during the assessment? Is a stakeholder mapping exercise needed as part of the assessment? Note that there are primary and secondary stakeholders. Primary stakeholders often are directly involved or have a direct influence on agriculture and land use in the assessment area, such as the male and female farmers, pastoralists, foresters, fishers and local market

	actors as well as youth. Secondary stakeholders would consist those with indirect interest or influence on agriculture and land use activities in the assessment areas, such as government, civil society and financial institutions. Ideally consultations with multiple stakeholders will enrich the design, interpretation and validation of the assessment and its outputs. **Audience:** Who is the intended audience of the assessment results?
Complementary projects and evidence	Are there any past or on-going assessments, studies or projects that would complement the planned assessment?
Support needs	What kind of support would be required from the SCALA global team and FAO/UNDP in-house technical teams?

ANNEX II – MAPPING OF RELEVANT TOOLS FOR SYSTEMS-LEVEL ASSESSMENTS

The table outlines a set of potential tools that may be adopted within the systems-level assessment in response to the research questions identified. The SCALA global team can provide technical support and/or liaise with the relevant FAO and UNDP technical teams responsible for managing the tools listed in the table.

RESEARCH QUESTIONS	ANALYTICAL COMPONENT	RELEVANT TOOLS/METHODS
What is the **state of natural resources and agriculture** in the assessment area?	Natural resources / Environmental Assessment	**FAO. Global Livestock Environmental Assessment Model (GLEAM)** It is a modelling GIS framework that simulates the bio-physical processes and activities along livestock supply chains under a life cycle assessment approach. This methodology is particular relevant to those countries that have identified in their NDC and NAMA, priorities with regard to move forward to a more sustainable livestock sector, since with the application of GLEAM will allow assessing potential adaptation and mitigation scenarios. **FAO, AFD, BMU. Adaptation-Biodiversity-Carbon (ABC) Map Toolkit** The Adaptation, Biodiversity and Carbon Mapping Tool (ABC-Map) is a new geospatial app based on Google Earth Engine that holistically assesses the environmental impact of National Policies and Plans (NDC, NAPs, etc) and investments in the AFOLU sector. The app is aligned with the objectives of the three Rio Conventions: United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD).

	Land use change analysis	**FAO. Collect Earth** It is designed so that users can analyse high and very high-resolution satellite imagery for different purposes, and in particular: i. support Land Use, Land Use Change and Forestry (LULUCF) assessments, ii. monitoring agricultural land and urban areas, iii. collection of spatially explicit socio-economic data and iv. quantifying deforestation, reforestation, and desertification
What are the **observed and/or expected climate-related impact**s on natural resources and agriculture systems in the assessment area? What are the **differentiated risks** associated with exposure to adverse climate change impacts on agriculture systems for different rural households and socio-economic groups?	Climate impact modeling Climate risk and vulnerability analysis	**FAO. Modeling System for Agricultural Impacts of Climate Change (MOSAICC)** It has been designed to carry out CC impact assessment studies at the national level. The models integrated in MOSAICC are organized in five main components: Climate, Crops, Hydrology, Forests, Economy. **FAO. Climate Risk Toolbox** (forthcoming) **FAO. Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP+) tool** It is an instrument to assess the resilience of farmer and pastoralist households. The concept of resilience is divided into three categories: exposure to a hazard, sensitivity to its effects, and the adaptive capacity to deal with them. SHARP is run through a customizable survey covering socio-economic, environmental and agronomic aspects of the farm system using a modular approach. **FAO. Damage and Loss Assessment in Agriculture methodology (D&L C2 Indicator)** It as a framework for identifying, analyzing and evaluating the impact of disasters on agriculture, including crops, livestock, aquaculture, fisheries and forestry. It can inform risk-related policy decision-making and planning. **FAO. Resilience Index Measurement and Analysis (RIMA-II)** It is a quantitative approach that enables a rigorous analysis of how households cope with shocks and stressors. Comparisons can be made between different types of households (for example, male-headed versus female-headed or urban versus rural) in a given country or area. **FAO. Rural Livelihoods Information System (RuLIS)** It provide users access to: i. more than 100 harmonized indicators, mostly computed from nationally representative household surveys, disaggregated by gender, rural/urban areas, expenditure quintiles, share of income from agriculture and farm size.

What are the relevant **gender and social inclusion** issues in the assessment area to be examined?	Gender analysis	**UNDP and FAO. Training guide: Gender in adaptation planning for the agriculture sectors** This guide provides a complete set of materials to be used in training workshops on mainstreaming gender in adaptation planning in the agriculture sector, and is a valuable resource to turn gender goals into concrete action.
What are the **GHG emissions/removals** associated with current agriculture and land use practices and value chains in the assessment area?	GHG assessment	**FAO. FAO. EX-Ante Carbon Balance Tool (EXACT)** It quantifies the amount of GHGs released or sequestered from agricultural production. It covers the Agriculture, Forestry and Other Land Use (AFOLU) sector, and can be used at any stage of the intervention, from the design, M&E of projects and policies to support informed decision-making processes. The version for value chains can assess the effects of interventions along the agricultural value chains, enabling the identification of off-farm sources of emissions and farm-to-retail socio-economic benefits. **NDC Expert Support Tool (NEXT)** NEXT provides a 30-year time-series of annual and cumulated estimates of carbon removal and GHG emissions reductions from climate actions made by countries, including policies, projects, NDC, NAMA, etc. NEXT provides a detailed temporal series of GHG results and a wide set of indicators, including the social value of carbon, enabling a comprehensive environmental and economic overview of climate actions in achieving mitigation targets. **FAO. Recarbonization of global agricultural soils (RECOSIL)** RECOSOIL a mechanism for scaling up sustainable soil management (SLM) with a focus on agricultre soil organic carbon (COS). RECSOIL allows for a) a feasibility assessment of the current soil organic carbon (SOC) stocks and the potential to sequester SOC in the productive systems/value chains; b) an appraisal of the interest of the farmers and farmer associations in those potential soil areas to adopt good practices, and receive technical support to access carbon credit markets and financial incentives; d) a methodology to measure, report and verify the impacts of the good practices adoption. This mechanism fits well with NDC and NAMA's priorities. One of RECSOIL's financing mechanisms is voluntary carbon credits.
Which **adaptation and mitigation options** exist and where? What are the differential costs and benefits of such options? Who would benefit from implementation and who might be left worse off? Which **technology** is associated with the implementation of the climate action and what barriers	Cost-benefit/multi-criteria analysis	**FAO/UNDP. Guide on Cost-Benefit Analysis (CBA) for climate change adaptation options:** This brief details the analytical/evaluation steps of the Costs and Benefits of the climate change adaptation and or mitigation options or projects in the agriculture sector. It allows to measure whether the benefits (to various beneficiaries or systems elements) of a climate action are larger than the costs, judged from the viewpoint of a society or a system as a whole. It allows evaluation and ranking of different CCA/M options according to their economic efficiency. From which, the CCA/M options that generate the great benefits at less costs as compared to what would have happened in the

and opportunities are there to its dissemination?		business as usual scenario are prioritized. A full brief detailing the analytical steps can be found here. **UNDP. Targeted Scenario Analysis**: This analysis approach enables policy makers and practitioners to determine how different options, for instance CCA/M actions affect the multiple economic, environmental and social objectives aimed to be achieved. It supports sustainable development decision making and planning. The analysis captures and presents the value and the contribution of the options, thereby making a case for investment choice. It embodies a participatory approach, involves developing and contrasting two scenarios – Business as usual versus Sustainable option, while allowing consideration of the diverse indicators related to all the sustainability elements - natural, environmental, economic and social including equity and gender. This analysis approach builds on and combines the traditional cost benefit analysis and economic valuation methods, broadening the type of information captured. It differs from these traditional approaches in that it takes a sector-specific approach to valuation. Detailed methodological steps can be found here.
Do the right **policy, financial and social incentives** exist to facilitate the uptake of prioritized intervention options? What are the **gaps, needs and challenges** that need to be addressed for system-level change?	Private sector investment risk/barrier analysis Institutional barrier analysis	**UNDP and FAO. Toolkit for value chain analysis and market development integrating climate resilience** This UNDP/FAO toolkit developed under the NAP-Ag programme supports the analysis of agricultural value chains for opportunities to improve climate change resilience and reduce gender inequalities. It allows the screening of the value chain nodes for climate related risks and vulnerabilities, and through a participatory approach supports the identification of new market opportunities and multi-actors partnerships to help communities (systems) adapt, and build resilience. The toolkit contains tools and methodologies for identifying relevant stakeholders and engaging with them to collect data and analyze it to come up with interventions for climate-resilient value chain development. It looks at stages during and beyond production, while using a more systemic approach to risk management. This tools and methodologies entailed in this toolkit can be adapted to any community (or system) context to support the development of select value chains. The toolkit can be found here.
Which **stakeholder** groups should be engaged for inclusive and effective implementation?	Stakeholder mapping	**SCALA. Private sector mapping module** (forthcoming) This is a brief developed under SCALA to provide guidance on conducting private sector mapping and outreach. It entails the considerations and methodological approaches to be followed while identifying and mapping stakeholders, prioritizing and segmenting stakeholders, and designing outreach and engagement plans.

The Support Programme on **Scaling up Climate Ambition on Land Use and Agriculture through Nationally Determined Contributions and National Adaptation Plans (SCALA)** is a five-year initiative led by FAO and UNDP, with funding from the German Federal Ministry for Economic Affairs and Climate Action (BMWK) through the International Climate Initiative (IKI). SCALA responds to the urgent need for increased action to cope with climate change impacts in the agriculture and land use sectors. The twenty million euro programme supports at least twelve countries in Africa, Asia and Latin America to build adaptive capacity and to implement low emission priorities.

Country support includes strengthening policies, adopting innovative approaches to climate change adaptation and removing barriers related to information gaps, governance, finance, gender mainstreaming and integrated monitoring and reporting. To achieve this shift, the programme engages the private sector and key national institutions.

SCALA supports countries to develop the capacity to own and lead the process to meet targets set out in their National Adaptation Plans and Nationally Determined Contributions under the Paris Agreement, and to achieve the Sustainable Development Goals. The SCALA initiative builds on another FAO-UNDP led programme, Integrating Agriculture in National Adaptation Plans (2015-2020) which has closed.

Food and Agriculture Organization of the United Nations
https://www.fao.org/in-action/scala/en

United Nations Development Programme
https://www.adaptation-undp.org/scala

International Climate Initiative (IKI)
www.international-climate-initiative.com

Germany's Federal Ministry for Economic Affairs and Climate Action (BMWK)
www.bmwk.de

Federal Ministry
for Economic Affairs
and Climate Action